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Takashi Yamamoto

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1834

23117

7590

04/21/2009

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EXAMINER

OLSEN, KAJ K

ART UNIT

PAPER NUMBER

1795

MAIL DATE

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendment has been entered because the examiner agrees that claim 7 had an obvious typographical error that has now been corrected.

### ***Response to Arguments***

2. Applicant's arguments filed 4/13/2009 have been fully considered but they are not persuasive. Applicant traverses the examiner's argument that the limitation drawn to the behavior of a water droplet when it falls onto the other surface of the heater member is merely an inherent property of a polished alumina surface. In particular, applicant urges that the behavior of the other surface of the heater member is combination of the heater member having a higher temperature at the other surface as well as the other surface having a ten points average roughness of no more than 1.71  $\mu\text{m}$ . It is unclear how any of this argument refutes the examiner's previous argument. In particular, Nakae already disclosed a heater member having an other surface (lower side of 16 in fig. 1) and already disclosed heating the sensor to an elevated temperature (fig. 6). Because the structure of Nakae is largely analogous to the structure of the present invention (compare fig. 1 of the present invention to fig. 2 of Nakae), then Nakae would have presumably also had its other surface also elevate to a higher temperature than the remainder of the sensor. Because Garvie and King rendered obvious the use of polishing as a strengthening means, and because King suggested polishing until the surface became "highly reflective" and Garvie showed the modulus of rupture for alumina continuously went up as an inverse function of surface roughness, this is all highly suggestive to

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one of ordinary skill in the art to utilize polishing down to an average surface roughness of no more than  $1.71\text{ }\mu\text{m}$ . Hence, if Nakae already disclosed a sensor analogous to the sensor of the present invention and taught heating it in a manner analogous to the present invention, and because Garvie and King both render obvious polishing alumina surfaces down to the claimed levels, then the behavior of a water droplet onto the other surface of the heater would have been an inherent result of the polishing suggested by Garvie and King. Furthermore, applicant's suggestion that of the criticality of treating the other surface because the other surface rises to a higher temperature ignores the fact that the applicant even suggest that the entire surface of the sensor could be treated (p. 17, ll. 19-21), and not just the other surface.

3. Moreover, these arguments do not appear to address the use of Hata, which explicitly suggested placing green ceramic elements onto a surface having a surface roughness of less than  $5\text{ or }2\text{ }\mu\text{m}$  during firing to allow them to slide readily during firing. The present invention evidences that the use of a surface having a surface roughness of less than  $8\text{ }\mu\text{m}$  would have resulted in a surface roughness for the fired ceramic element of no more than  $1.71\text{ }\mu\text{m}$ . See p. 19, ll. 12-19 and p. 20, ll. 9-13. Hence even if the applicant does not believe that Garvie and King establish the use of a surface roughness of no more than  $1.71\text{ }\mu\text{m}$ , the teaching of Hata is still relevant to the claimed subject matter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAJ K. OLSEN whose telephone number is (571)272-1344. The examiner can normally be reached on M-F 5:30-2:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Kaj K Olsen/  
Primary Examiner, Art Unit 1795  
April 21, 2009